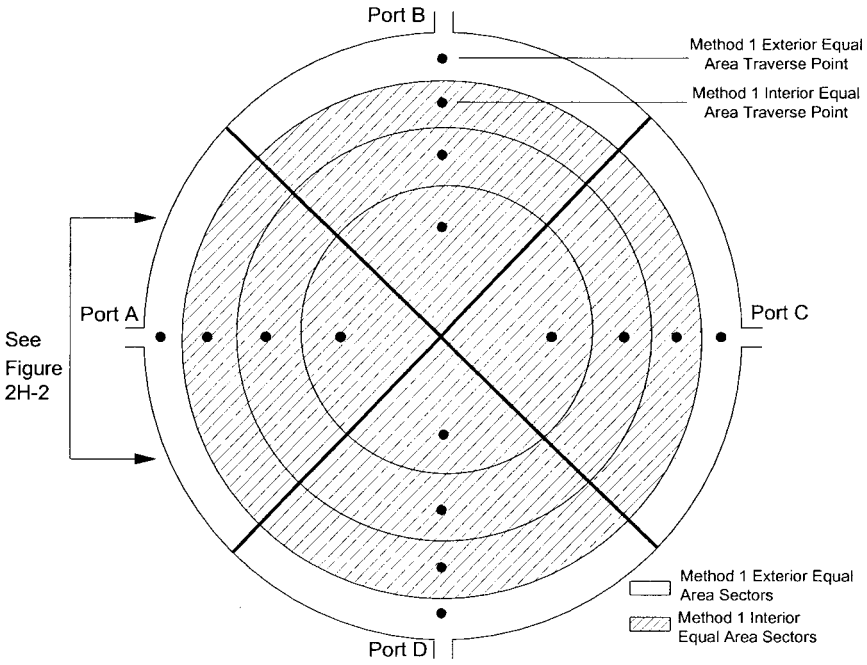

Figure 2H-1. Method 1 exterior and interior equal-area sectors with traverse points indicated.

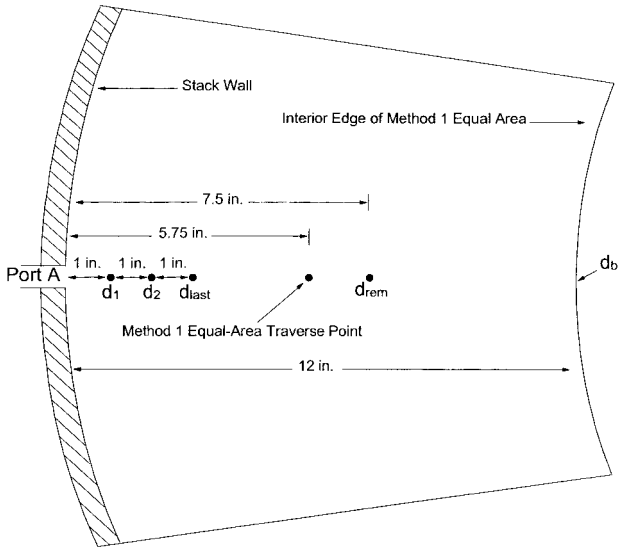

Figure 2H-2. Figure showing part of a Method 1 equal-area sector closest to the stack wall with three illustrative wall effects points at 1 in. intervals, the Method 1 equal-area traverse point, and d_{rem} for a 15 ft diameter stack.[1]

[1] Metric equivalents of English units used in Figure 2H-2 are as follows: 1 in. = 2.5 cm; 5.75 in. = 14.6 cm; 7.5 in. = 19.0 cm; 12 in. = 30.5 cm; and 15 ft = 4.6 m.

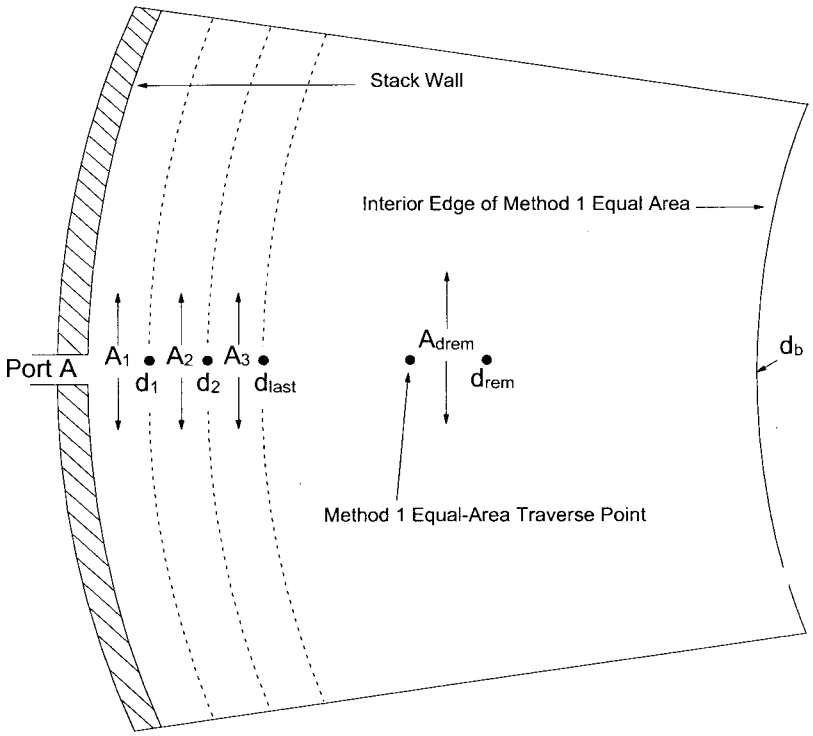

Figure 2H-3. Figure showing part of a Method 1 equal-area sector closest to the stack wall with three illustrative sub-sectors between the stack wall and d_{last} and the sub-sector represented by d_{rem}. A_1 is the area between the stack wall and d_1, A_2 is the area between d_1 and d_2, A_3 is the area between d_2 and d_{last}, and A_{drem} is the area between d_{last} and the interior edge of the Method 1 equal-area sector.

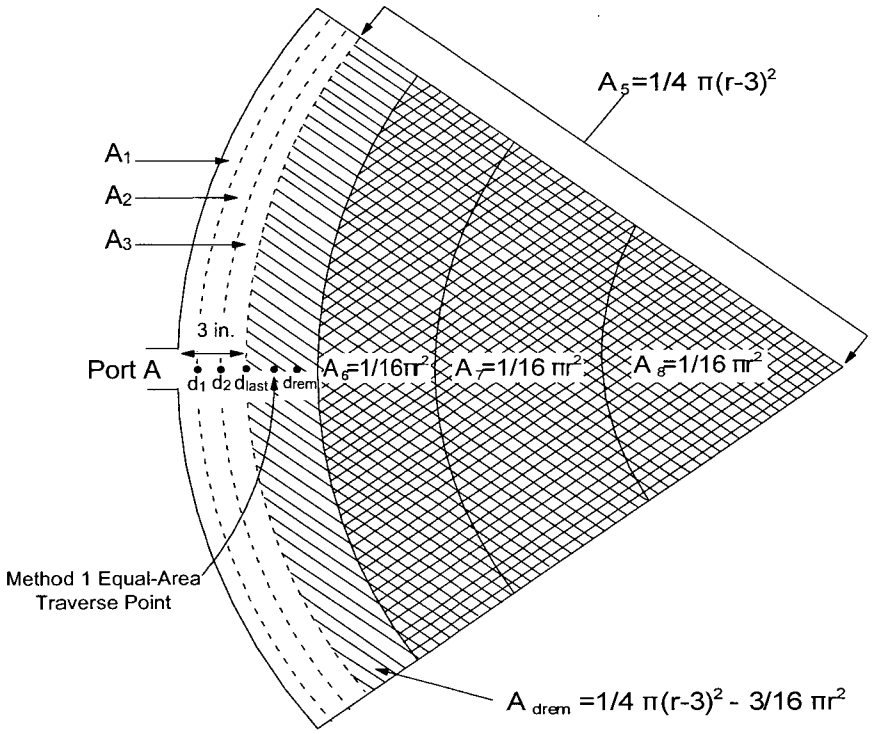

Figure 2H-4. Figure illustrating the calculations in Equation 2H-12 used to calculate the cross sectional area of the sub-sector between d_{last} and the interior edge of the Method 1 sector closest to the stack wall (A_{drem}) for a 16-point Method 1 traverse. The Method 1 equal-area traverse point and four wall effects traverse points (d_1, d_2, d_{last}, and d_{rem}) within the Method 1 sector closest to the stack wall are also shown.[1]

[1] All dimensions are given in in. Metric equivalents (in cm) are as follows: 3 in. = 7.6 cm; A_5 = 1/4 π(r-7.6)^2; and A_{drem} = 1/4 π(r-7.6)^2 - 3/16 πr^2.

Form 2H-1. Calculation of Wall Effects Replacement Velocity Values (16-Point Method 1 Traverse)

1st Probe Type/ID/Pts. Sampled: _____ Tester(s): _____

2nd Probe Type/ID/Pts. Sampled: _____ Affiliation: _____

Entry Port ID (e.g., A, B, C, or D): _____

1. Diameter of the stack or duct (ft)		Radius, r, of the stack or duct (in.) (= diameter × 6)	

2. Location (column A), measured and decay velocities (columns B and C), and volumetric flow (column G) associated with each successive wall effects traverse point.

(A)	(B)	(C)	(D)	(E)	(F)	(G)
Distance (d) from Wall	Measured Velocity (v_d) at Distance d	Decay Velocity ($vdec_d$)	Intermediate Calculations		Area of Sub-sector (A_d)	Volumetric Flow in Sub-sector (Q_d)
		$\frac{v_{d-1}+v_d}{2}$ Note: $v_0 = 0$	$\frac{1}{4}\pi[r-d+1]^2$	$\frac{1}{4}\pi[r-d]^2$	(Col. D - Col. E)	(Col. C × Col. F)
(*in.*)	(*ft/sec*)	(*ft/sec*)	(*in.*^{2})	(*in.*^{2})	(*in.*^{2})	(*ft-in.*^{2}/*sec*)
$d = 1$						
$d = 2$						
. . .						
d_{last}						

Note: $d_{last} \leq 0.1340\ r$, where r is the radius of the stack or duct. See section 8.2.2.3 of the method.

3. Total volumetric flow for all sub-sectors located between stack wall and d_{last} (total Col. G).	
4. Volumetric flow for remainder of the Method 1 equal-area sector.	
a. Velocity measurement at distance d_{rem} from stack wall (v_{drem}). (If d_{rem}- d_{last}<½ in., then no measurement at d_{rem} is necessary. Enter the velocity at d_{last} on this line.)	
b. Total area in remainder of Method 1 equal-area segment (A_{drem}). Subtract $\frac{3}{16}\pi(r)^2$ from last entry in item 2, column E, and enter the result on this line.	
c. Multiply values on lines 4a and 4b. (Q_{drem})	
5. Wall effects-adjusted velocity in the Method 1 equal-area sector.	
a. Add the values on lines 3 and 4c. (Q_T)	
b. Divide line 5a by $\frac{1}{16}\pi(r)^2$. The resulting value is one of four "replacement" point velocity values adjusted for wall effects, $\hat{v}e_j$, as derived in Equation 2H-16.	
6. Substitute the value shown in 5b for the unadjusted velocity value in the Method 1 sector. (See Eq. 2H-18.)	

Notes: 1. Column B: If no measurement is taken at distance d, enter the velocity value obtained at the first subsequent traverse point where a measurement was taken, followed by the letters "NM". See section 8.7.1.2.

2. For clarity, only English units are shown in this form. Following are metric equivalents of the English units used in the form. In row 2, column A: 1 in. = 2.5 cm; 2 in. = 5.1 cm. In row 2, column D: If metric units (cm) are used, the term $\frac{1}{4}\pi(r-d+1)^2$ must be changed to $\frac{1}{4}\pi(r-d+2.5)^2$. In row 4a: ½ in. = 12.7 mm. Throughout the form, the metric equivalents of *in.*, *in.*^{2}, *ft*, *ft/sec*, and *ft-in*^{2}*/sec* are *cm*, *cm*^{2}, *m*, *m/sec*, and *m-cm*^{2}*/sec*, respectively.

Form 2H-2. Calculation of Wall Effects Replacement Velocity Values (Any Method 1 Traverse ≥16 Points)

1st Probe Type/ID/Pts. Sampled: _____ Tester(s): _____

2nd Probe Type/ID/Pts. Sampled: _____ Affiliation: _____

Entry Port ID (e.g., A, B, C, or D): _____

1. Diameter of the stack or duct (ft)		Radius, r, of the stack or duct (in.) (= diameter × 6)	

2. Location (Column A), measured and decay velocities (Columns B and C), and volumetric flow (Column G) associated with each successive wall effects traverse point.

(A)	(B)	(C)	(D)	(E)	(F)	(G)
Distance (d) from Wall	Measured Velocity (v_d) at Distance d	Decay Velocity ($vdec_d$)	Intermediate Calculations		Area of Sub-sector (A_d)	Volumetric Flow in Sub-sector (Q_d)
		$\frac{v_{d-1}+v_d}{2}$ Note: $v_0 = 0$	$\frac{2}{p}\pi[r-d+1]^2$	$\frac{2}{p}\pi[r-d]^2$	(Col. D - Col. E)	(Col. C × Col. F)
(*in.*)	(*ft/sec*)	(*ft/sec*)	(*in.*^{2})	(*in.*^{2})	(*in.*^{2})	(*ft-in.*^{2}/*sec*)
$d = 1$						
$d = 2$						
. . .						
d_{last}						

Note: $d_{last} \le d_b$, as defined in section 8.2.2.3 of the method.

3. Total volumetric flow for all sub-sectors located between stack wall and d_{last} (total Col. G).	
4. Volumetric flow for remainder of the Method 1 equal-area sector.	
a. Velocity measurement at distance d_{rem} from stack wall (v_{drem}). (If $d_{rem} - d_{last} < ½$ in., then no measurement at d_{rem} is necessary. Enter the velocity at d_{last} on this line.)	
b. Total area in remainder of Method 1 equal-area segment (A_{drem}). Subtract $\left\{\frac{p-2}{4p}\right\}\pi(r)^2$ from last entry in item 2, column E, and enter the result on this line.	
c. Multiply values on lines 4a and 4b. (Q_{drem})	
5. Wall effects-adjusted velocity in the Method 1 near-wall equal-area segment.	
a. Add the values on lines 3 and 4. (Q_T)	
b. Divide line 5a by $\left\{\frac{1}{2p}\right\}\pi(r)^2$. The resulting value is one of four "replacement" point velocity values adjusted for wall effects, $\hat{v}e_j$, as derived in Equation 2H-15.	
6. Substitute the value shown in 5b for the unadjusted velocity value in the Method 1 sector. (See Eq. 2H-17.)	

Notes: 1. Column B: If no measurement is taken at distance d, enter the velocity value obtained at the first subsequent traverse point where a measurement was taken, followed by the letters "NM". See section 8.7.1.2.

2. For clarity, only English units are shown in this form. Following are metric equivalents of the English units used in the form. In row 2, column A: 1 in. = 2.5 cm; 2 in. = 5.1 cm. In row 2, column D: If metric units (cm) are used, the term $¼\,\pi(r-d+1)^2$ must be changed to $¼\,\pi(r-d+2.5)^2$. In row 4a: ½ in. = 12.7 mm. Throughout the form, the metric equivalents of *in.*, *in.*^{2}, *ft*, *ft/sec*, and *ft-in*^{2}*/sec* are *cm*, *cm*^{2}, *m*, *m/sec*, and *m-cm*^{2}*/sec*, respectively.

Form 2H-3. Calculation of Replacement Velocity Values for a Method 1 Equal-Area Sector Closest to the Stack Wall for a 16-Point Method 1 Traverse, Using a Partial Wall Effects Traverse

1st Probe Type/ID/Pts. Sampled: *Type S Straight-up/S-13/All* Tester(s): *Test Team III*

2nd Probe Type/ID/Pts. Sampled: _____ Affiliation: *Contractor III*

Entry Port ID (e.g., A, B, C, or D): *A*

1. Diameter of the stack or duct (ft)	*24*	Radius, r, of the stack or duct (in.) (= diameter × 6)	*144*

2. Location (column A), measured and decay velocities (columns B and C), and volumetric flow (column G) associated with each successive wall effects traverse point.

(A)	(B)	(C)	(D)	(E)	(F)	(G)
Distance (d) from Wall	Measured Velocity (v_d) at Distance d	Decay Velocity ($vdec_d$)	Intermediate Calculations		Area of Sub-sector (A_d)	Volumetric Flow in Sub-sector (Q_d)
		$\frac{v_{d-1}+v_d}{2}$ Note: $v_0 = 0$	$\frac{1}{4}\pi[r-d+1]^2$	$\frac{1}{4}\pi[r-d]^2$	(Col. D - Col. E)	(Col. C × Col. F)
(*in.*)	(*ft/sec*)	(*ft/sec*)	(*in.*^{2})	(*in.*^{2})	(*in.*^{2})	(*ft-in.*^{2}/*sec*)
d = 1	*51.71 NM*	*25.85*	*16,286.00*	*16,060.59*	*225.41*	*5,827.47*
d = 2	*51.71 NM*	*51.71*	*16,060.59*	*15,836.76*	*223.84*	*11,573.72*
d_{last} *= 3*	*51.71*	*51.71*	*15,836.76*	*15,614.49*	*222.27*	*11,492.51*

3. Total volumetric flow for all sub-sectors located between stack wall and d_{last} (total Col. G).	*28,893.70*
4. Volumetric flow for remainder of the Method 1 equal-area sector.	
a. Velocity measurement at distance d_{rem} from stack wall (v_{drem}). (If d_{rem} - d_{last} <½ in., then no measurement at d_{rem} is necessary. Enter the velocity at d_{last} on this line.)	*77.01*
b. Total area in remainder of Method 1 equal-area segment (A_{drem}). Subtract $\frac{3}{16}\pi(r)^2$ from last entry in item 2, column E, and enter the result on this line.	*3,399.99*
c. Multiply values on lines 4a and 4b. (Q_{drem})	*261,832.90*
5. Wall effects-adjusted velocity in the Method 1 equal-area sector.	
a. Add the values on lines 3 and 4c. (Q_T)	*290,726.61*
b. Divide line 5a by $\frac{1}{16}\pi(r)^2$. The resulting value is one of four "replacement" point velocity values adjusted for wall effects, $\hat{v}e_j$, as derived in Equation 2H-16.	*71.41*
6. Substitute the value shown in 5b for the unadjusted velocity value in the Method 1 sector. (See Eq. 2H-18.)	